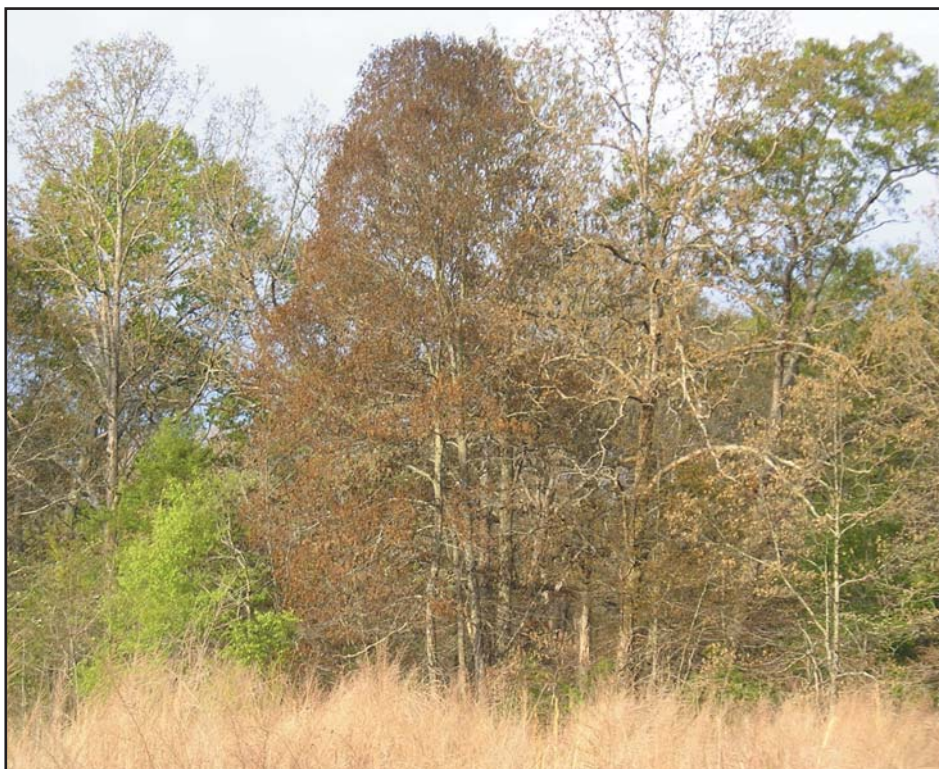


# Forests Continue to Shudder from the Spring Freeze of 2007

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Photo by Arthur Hitt



**W**hen the temperatures dipped down into the teens and twenties for several days this past Easter, it affected agricultural crops, urban trees, and hardwood forests across the Southeastern states. The dieback of leaves was apparent on trees in northern parts of Alabama, Mississippi, Georgia, and north into Tennessee, Kentucky, and parts of the Carolinas.

The late season freeze did the greatest damage to plants and trees that were already flowering or leafing out. Many hardwoods had leafed out early because of the warm temperatures during the previous month. Freezes such as this are not common, but they do occasionally occur. The answers to the following questions may help you understand more about what happened where you live.

## What short-term impacts do these late-season freezes have on trees?

Dr. Wayne Clatterbuck, Associate Professor of Forest Management and Silviculture at the University of Tennessee, explains that red and white oaks, hickories, yellow-poplar, hackberry, and sycamore were affected most by the freezing temperatures; maples were not. Trees use a great amount of stored carbohydrates (energy) to produce new leaves, and the plant tissues produced from these energy reserves were destroyed during the freeze. To releaf, trees must re-mobilize additional carbohydrates, a demand that creates unexpected stress. Most trees progressively burst buds, such that there are some buds remaining to leaf out after a freeze. Dormant and other suppressed buds are

then activated during the second leaf emergence. Since carbohydrate and energy reserves are lower during the second refoliation, the crowns of refoliated trees are sparse with fewer, smaller, and less dense leaves than normal.

## What are the possible long-term effects from the freeze?

Dr. Clatterbuck answers that most trees will recover from a single defoliation associated with a freeze. However, any other stress encountered by the tree may cause irreversible damage and loss. Defoliation is a primary, initial cause of tree decline, and the role of climatic and other environmental factors influence the severity of the defoliation. Both prolonged droughts and the secondary impacts of opportunistic insects (defoliators and wood borers) and disease (fungi and cankers) that are attracted to stressed trees can have severe detrimental impacts on tree health. To alleviate additional tree stress, keep landscape trees watered during droughty periods. Slowly, trees should regain lost carbohydrates and continue to strengthen energy reserves. In forested areas, there is little that can be done on a large scale. If trees have declined severely but have an economic value, a harvest should be considered before they further deteriorate.

Another future consequence of the freeze will be limited flower and subsequent fruit and seed production. Not only are the current year's flowers affected, but reduced energy reserves will impact next year's flowers too. In our current scenario, most all commercial fruit orchards have substantial losses. The yield of both hard and soft mast (acorns, nuts, and fruits) will be low. The flowers

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of white oaks were affected such that acorn crops will be limited, having an impact on wildlife populations. Because it takes two years from pollination to produce red oak acorns, this production will be affected in 2008. However, the "acornets" (immature acorns) of red oaks from flowers pollinated in spring 2006 will probably produce some acorns for this year, if they are not aborted due to stress. This process is further examined in the following paragraphs.

## What are the consequences of the freeze for wildlife?

Dr. Becky Barlow, Extension Forester/Assistant Professor at the School of Forestry and Wildlife Sciences, Auburn University, and Dr. Edward Loewenstein, Assistant Professor, Silviculture at the School of Forestry and Wildlife Sciences, Auburn University, explain the impacts of the cold weather on mast production and wildlife:

The 2007 late-spring freeze killed back new growth on many hardwoods trees, particularly those in northern Alabama. It could also potentially impact acorn production on both red and white oaks in the coming year. Acorn crop success is of interest not only for forest reproduction, but also because acorns are an important food source for much of Alabama's wildlife population including deer, turkey, waterfowl, and small mammals such as squirrels and rabbits.

Oaks flower in early spring between March and April. If the crop is a success,

white oak acorns mature in late summer, and then fall from the canopy beginning in September and October of the same year. Late freezes may affect current year white oak acorn production, but cause little damage to existing red oak crops that were pollinated last year. Low temperatures in the spring often do not adversely affect oak flowers and pollination. However, late spring freezes that damage new shoots and leaves, such as the one that occurred this year, may impact mast production. Landowners and forest managers should survey their trees in July and August for maturing acorns to better determine fall production.

The good news is that even widespread freezes do not affect all timber stands in the same way, potentially limiting losses across the state. Southern portions of the state may see less damage than northern counties. Even in areas that were hard hit by the freeze, small differences in slope position (ridge top vs. lower slope) and aspect (south vs. north facing slope) may greatly affect the crop.

Success of acorn crops can vary widely from year to year. Other factors that can cause acorn crop failure in oaks are tree age, stand density (overcrowding), insect damage, increased rainfall during the time of pollination, hail, and severe weather.

## How do you care for freeze-damaged trees?

The best advice is to do nothing and wait to see how the trees respond. There

is not much you can do on a large scale for hardwood timber stands. With the trees using stored carbohydrates to leaf out a second time, any added stresses such as that caused by drought, wildfires, or insects and disease will add to the decline of the health of the stand and the health of individual trees.

For landscape trees, Dr. David Mercker, Extension Forester with the University of Tennessee, advises to "water, water, water, but not to the point of continual saturation." Watering will help trees recover along with the increasing temperatures, but DO NOT fertilize until the end of the next winter, e.g. January and February of 2008. Quick release fertilizers will only encourage further depletion of carbohydrate reserves, causing more stress on the trees which could result in them dying.

## Summary

Wildlife that depend on hard and soft mast crops are likely to be hungry this coming winter. Therefore, this will be an important year for food plots.

Monitor your timber stands closely for the next few years for signs of decline in the overall health. As trees foliate a second time due to the late freeze, they will deplete carbohydrate reserves and be more susceptible to the effects of drought as well as insect and disease infestations. These cumulative stresses could lead to diminished growth and possible mortality. ☙

## TREE GRANTS Available

**The time is now to apply for tree grants.** The Alabama Power Foundation, in partnership with the Alabama Urban Forestry Association (AUFA), is accepting applications for the 2007 Community Forestry Program.

Over the past eight years, more than \$400,000 has been distributed in tree grants to nearly 400 cities, counties, schools, and community groups. Grants have been used to buy thousands of trees for planting in community parks, along roadways, and on school grounds, among other sites, facilitating a positive impact on our environment.

The Community Forestry Project is open to local governments; nonprofit groups; and public and private schools, colleges, and universities. Grants of up to \$2,000 are awarded. Applications must be postmarked by Aug. 31, 2007. Winners will be notified no later than November 15, 2007.

For more information about tree grant requirements or to obtain an application form, log on to one of the following web pages: [www.AlabamaPowerFoundation.com](http://www.AlabamaPowerFoundation.com) or [www.aufa.com](http://www.aufa.com).

